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ABSTRACT

This guide, which is designed for use by Maryland technology education (TE) teachers, content supervisors, and school improvement teams, outlines a review process to align TE programs across Maryland with the goals established by the state's board of education. First, the guide's purpose is stated, and the following steps of the TE assessment process are reviewed: planning the assessment, conducting the assessment, reporting the assessment findings, and overcoming the weaknesses identified during the assessment. The remainder of the guide presents Maryland's TE quality indicators, which are organized into sections devoted to the following aspects of TE: philosophy; population served; instructional program (instruction/curriculum in grades K-5, 6-8, 9-10, and 11-12; TE teaching/learning strategies); advisory committees; facilities, equipment, and materials; administration and supervision; and instructional staff. The quality indicators pertaining to TE teaching/learning strategies are further subdivided into sections devoted to the following: topic investigations, modular technology activity, product generation, research and experimentation, and engineering design/development. Each section includes a brief discussion of the specific aspect of TE being assessed and proceeds to list the standards and criteria for standards that are being met. Checklists of quality indicators pertaining to each criterion are also provided. Appended are assessment forms and a glossary. (MN)

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ED 386 600

# QUALITY INDICATORS

# FOR

# TECHNOLOGY EDUCATION

# PROGRAMS IN MARYLAND

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## FOREWORD

The Maryland State Department of Education recognizes the importance of aligning technology education programs with the goals established by the State Board of Education. To ensure that programs are integral to this thrust, quality criteria must exist to measure progress in achieving excellence in technology education programs.

The State of Maryland has taken the lead, nationally, in addressing the issue of technological literacy. Through the establishment of high school graduation requirements in technology education, we are committed to providing educational experiences that will enable students:

- to interact successfully with technology,
- to assess the impact of technology on everyday life and make appropriate decisions, and
- to apply conceptual knowledge to solve problems.

Program assessment is critical to the maintenance of quality technology education programming. The *Quality Indicators for Technology Education Programs in Maryland* are aimed at accomplishing this task. They provide information for making decisions designed to increase student learning.

## PURPOSE

*Quality Indicators for Technology Education Programs in Maryland* is designed for use by teachers, content supervisors, and school improvement teams to review technology education programs. This document is a companion piece to *Technology Education: A Maryland Curricular Framework* which contains the student-centered outcomes for technology education. **It should be noted that use of the *Quality Indicators for Technology Education Programs in Maryland* is voluntary; there is no state mandate requiring their use.**

The use of indicators to improve technology education program quality will have an impact on the school and community. School improvement teams, content supervisors, and individual teachers will find the quality indicators useful as targets for program improvement. The review process presented here fosters open communication between the school, the public, and business and industry. *Quality Indicators for Technology Education Programs in Maryland* is an authoritative and contemporary resource for improving instruction.

## User's Guide for the Quality Indicators

Each school should have a systematic, continuous evaluation process which uses accepted standards to assess all elements of its technology education program. The quality indicators contained in this publication will serve this purpose. The narrative that follows illustrates how the *Quality Indicators for Technology Education Programs in Maryland* will fit into the evaluation process. To simplify this process, assessment can be divided into four major steps. They are: planning an assessment, conducting an assessment, reporting findings, and overcoming weaknesses.

Step 1 - **Planning an Assessment**
Before a program is assessed, decisions must be made concerning a) which program will be assessed, b) the membership of the assessment team, and c) when the assessment will take place. The assessment process may be initiated by a local administrator, a school principal, or a technology teacher. The assessment team should include one or more technology education teacher, a school administrator, a student, a parent, and a business representative. Team members should meet to become familiar with the quality indicators and assessment process.

Step 2 - **Conducting an Assessment**
The assessment process involves comparing a given technology education program to standards. In the process, the assessment team records whether the program meets each quality indicator. A condensed profile of the program assessment may be drawn using the *Technology Education Program Profile Form* (see section on *Assessment Forms*).

Step 3 - **Reporting the Findings of an Assessment**
The assessment team reports the strengths and weaknesses of the program to personnel responsible for correcting weaknesses. The weaknesses are explained and suggestions for correcting weaknesses are made on the *Continuous Improvement Report* (see section on *Assessment Forms*).

Step 4 - **Overcoming Weaknesses Identified in the Assessment**
Procedures and resources are employed to overcome the weaknesses. The assessment team monitors those procedures to determine their success in correcting weaknesses and recommends a time line for program reassessment.

An understanding of the classification and organization of the quality indicators is necessary before conducting an assessment of the technology education program.

The *Quality Indicators for Technology Education Programs in Maryland* are grouped into seven (7) areas. They are:

A. Philosophy
B. Population Served
C. Instructional Program
D. Advisory Committee
E. Facilities/Equipment/Materials
F. Administration/Supervision
G. Instructional Staff

Each of the major areas includes statements of standards, criteria, and quality indicators.

For example, Philosophy is divided into three subtopics:

1.1 Content,
1.2 Development, and
1.3 Dissemination and Utilization.

Each of these subtopics contains a number of quality indicators to which the program may be compared. The process of assessing a program with the quality indicators is relatively simple. Next to each standard are the words "Yes" and "No." Assessing a program with the standard means indicating whether the program does or does not meet the quality indicator.

On the last page of each standard topic there is a section entitled "Summary for Profile." In this section a space is provided to record the number of quality indicators marked "No." Subtracting this number from the total number of indicators for the topic determines the number that meet the standard. The number of quality indicators met for each topic is used to compile a program profile. A *Technology Education Program Profile* is provided in the *Assessment Forms Section* following Standard Topic VII.

A major component of assessing a technology education program is the correction of identified weaknesses. It is recommended that a separate report be filled out for each quality indicator marked "No." A *continuous Improvement Report Form* is provided in the Assessment Forms section for this purpose. The report form should be completed by the assessment team.

After the *Continuous Improvement Report Forms* have been completed, they should be presented to administrators, school board members, or others responsible for the technology education program. The reports will provide guidance to the person(s) responsible for correcting program weaknesses. The correction process should be monitored by the assessment team, as needed, to assure that each weakness is corrected. After all weaknesses are corrected to the assessment team's satisfaction, the overall assessment process is completed.

## Section A

## PHILOSOPHY

A philosophy is an explicit statement of the beliefs that direct all aspects of a school system's curriculum. Developing a statement of philosophy allows educators to reach a consensus about the nature of the subject matter as it relates to the instructional program. A clear statement of philosophy, therefore, can aid the school system in developing goals, specifying instructional strategies, and assessing programs.

A comprehensive philosophy should begin by addressing the subject matter, its relationship to society, and its relationship to learners. Based upon a synthesis of these elements, a clear position statement should be developed to direct the structuring of the curriculum.

The technology education philosophy includes statements regarding the:

a. Program mission (Why is the program important?),
b. Program content,
c. Teaching/learning strategies utilized, and
d. The evaluation and updating of the program.

STANDARD: A. Philosophy - A philosophy is developed and utilized in the technology education program.

CRITERION: A.1. Content - The philosophy states the rationale for the technology education program. The philosophy also addresses the needs of society and the learner.

QUALITY INDICATORS:

The philosophy incorporates the mission of technology education:

| | | |
|---|---|---|
| A.1.1 | To develop "technological literacy" through experiences in which resources (people, information, tools and machines, materials, energy, capital, and time) are used to solve problems and to meet human needs and desires. | Yes No |
| A.1.2 | To provide students with the basic understandings and current skills needed to function effectively in society. | Yes No |
| A.1.3 | To develop in all students the ability to reason, solve problems, create, construct, and use materials imaginatively. | Yes No |
| A.1.4 | To enable students to become wise consumers and productive members of the community. | Yes No |

| | | |
|---|---|---|
| A.1.5 | To apply science, mathematics, language arts, social studies, and technological concepts to solve practical problems and extend human capabilities. | Yes No |

The philosophy:

| | | |
|---|---|---|
| A.1.6 | Is consistent with the current state technology education philosophy. | Yes No |
| A.1.7 | Is consistent with state education goals and school improvement initiatives. | Yes No |
| A.1.8 | Reflects the State Approved Learner Outcomes (goals) for Technology Education. See *Technology Education - A Maryland Curricular Framework*. | Yes No |

CRITERION: A.2. Development - The philosophy is developed by the technology education staff.

QUALITY INDICATORS:

The statement of philosophy is:

| | | |
|---|---|---|
| A.2.1 | Developed by the technology education staff using input from students, parents, administrators, supervisory personnel, and community members. | Yes No |
| A.2.2 | Reviewed periodically and revised when necessary to reflect relevancy of the program. | Yes No |

CRITERION: A.3. Dissemination and Utilization - The philosophy is applied to all facets of the technology education program.

QUALITY INDICATORS:

The philosophy is:

| | | |
|---|---|---|
| A.3.1 | A statement in printed form, available and distributed to technology education staff, counselors, advisory committee members, appropriate administrators, and other interested persons. | Yes No |

| | | |
|---|---|---|
| A.3.2 | Utilized for program planning, development, and implementation. | Yes No |
| A.3.3 | Utilized for evaluation of the program. | Yes No |

Summary:

| | |
|---|---|
| 13 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

## Section B

## POPULATION SERVED

Population served is defined as persons with differing age, racial/ethnic background, socio-economic status, academic differences, limited English proficiency, physical and mental disabilities, who will have access on an equal basis to the technology education program.

STANDARD: B. Population - The population is identified.

CRITERION: B.1. Enrollment - All population types are represented in the technology education program.

QUALITY INDICATORS:

Students from all population types are represented in the same proportion that they are enrolled in the school.

| | Gender | Number enrolled in school | Number enrolled in a Technology Education course(s) | Percent enrolled in a Technology Education course(s) | Students in group represented in the same proportion that they are enrolled in the school. |
|---|---|---|---|---|---|
| B.1.1 | Male | | | | Yes No |
| B.1.2 | Female | | | | Yes No |

| | Race/Ethnicity | Number enrolled in school | Number enrolled in a Technology Education course(s) | Percent enrolled in a Technology Education ourse(s) | Students in group represented in the same proportion that they are enrolled in the school. |
|---|---|---|---|---|---|
| B.1.3 | American Indian | | | | Yes No |
| B.1.4 | Asian | | | | Yes No |
| B.1.5 | African American | | | | Yes No |
| B.1.6 | Caucasian | | | | Yes No |
| B.1.7 | Hispanic | | | | Yes No |
| B.1.8 | Other | | | | Yes No |

| | **Special Populations** | Number enrolled in school | Number enrolled in a Technology Education course(s) | Percent enrolled in a Technology Education course(s) | Students in group represented in the same proportion that they are enrolled in the school |
|---|---|---|---|---|---|
| B.1.9 | Limited English Proficiency | | | | Yes No |
| B.1.10 | Disabled Individuals | | | | Yes No |
| B.1.11 | Disadvantaged Persons | | | | Yes No |
| B.1.12 | Gifted and Talented | | | | Yes No |
| B.1.13 | Other (i.e., at risk etc.) | | | | Yes No |

CRITERION: B.2. Completion - All populations are successfully completing technology education course(s).

QUALITY INDICATORS:

| | **Gender** | Number enrolled in Technology Education course(s) | Number successfully completing course(s) | Percent successfully completing course(s) | Students are successfully completing course(s) |
|---|---|---|---|---|---|
| B.2.1 | Male | | | | Yes No |
| B.2.2 | Female | | | | Yes No |

| | **Race/Ethnicity** | Number enrolled in Technology Education course(s) | Number successfully completing course(s) | Percent successfully completing course(s) | Students are successfully completing course(s) |
|---|---|---|---|---|---|
| B.2.3 | American Indian | | | | Yes No |
| B.2.4 | Asian | | | | Yes No |
| B.2.5 | African American | | | | Yes No |
| B.2.6 | Caucasian | | | | Yes No |
| B.2.7 | Hispanic | | | | Yes No |
| B.2.8 | Other | | | | Yes No |

| | **Special Populations** | Number enrolled in Technology Education course(s) | Number successfully completing course(s) | Percent successfully completing course(s) | Students are successfully complete course(s) |
|---|---|---|---|---|---|
| B.2.9 | Limited English Proficiency | | | | Yes No |
| B.2.10 | Disabled Individuals | | | | Yes No |
| B.2.11 | Disadvantaged Persons | | | | Yes No |
| B.2.12 | Gifted and Talented | | | | Yes No |
| B.2.13 | Other | | | | Yes No |

Summary:

| | |
|---|---|
| 26 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

**Section C**

## INSTRUCTIONAL PROGRAM

Section C includes the following subsections:

- C.1 Instruction/Curriculum
- C.2 Curriculum Resources
- C.3 Teaching/Learning Strategies
- C.4 Instructional Program Evaluation
- C.5 Student Assessment

Standard C.1 is organized according to grade level. (K-5, 6-8, 9-10, and 11-12) Use only the portion(s) of this section that is appropriate to your program.

Section C.3, Teaching/Learning Strategies, includes all of the strategies that have proven effective in enabling students to achieve the technology education outcomes.

## TECHNOLOGY EDUCATION
## INSTRUCTIONAL PROGRAM
### Grades K-5

The instructional program in technology education for grades K-5 develops students' awareness of technology. It reinforces basic learning through hands-on activities such as technology investigations, technology challenges, and product generation.

STANDARD: C. Instructional Program - The instructional program reflects the state and local technology education philosophy.

CRITERION: C.1. Instruction/Curriculum - Instruction is based on the learner outcomes for technology education.

QUALITY INDICATORS:

Instruction is provided that enables students to:

| | | |
|---|---|---|
| C.1.1 | Express that people have created technology systems to satisfy basic needs and desires. (Expectancy 1.1.1) | Yes No |
| C.1.2 | Identify where technology is used in the school, home, and community. (Expectancy 1.1.3) | Yes No |
| C.1.3 | Express that technology has the potential for both positive and negative impacts. (Subgoal 2.2) | Yes No |
| C.1.4 | Identify formal and informal approaches to problem solving. (Expectancy 3.1.1) | Yes No |
| C.1.5 | Identify the relationship between science, mathematics, and technology. (Expectancy 6.1.1) | Yes No |
| C.1.6 | Describe examples of technology's role in shaping history. (Expectancy 6.4.1) | Yes No |
| C.1.7 | Identify technology-related careers. (Goal 7) | Yes No |
| C.1.8 | Express that technology is created by innovative men and women from diverse cultures. (Goal 8) | Yes No |
| C.1.9 | Investigate how things (technology systems) work. (Subgoal 1.2) | Yes No |
| C.1.10 | Apply knowledge, tools, and skills to solve practical problems. (Goal 3) | Yes No |

Note: The information in parentheses indicates citations from *Technology Education - A Maryland Curricular Framework*.

Summary:

| | |
|---|---|
| 10 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

## TECHNOLOGY EDUCATION
## INSTRUCTIONAL PROGRAM
### Grades 6-8

The instructional program in technology education for grades 6-8 is characterized by the term "exploration." Students explore the enterprises and institutions that use technology to meet human needs and desires.

STANDARD: C. Instructional Program - The instructional program reflects the state and local technology education philosophy through its curriculum.

CRITERION: C.1. Instruction/Curriculum - Instruction is based on the learner outcomes for technology education.

QUALITY INDICATORS:

Instruction is provided that enables students to:

| | | |
|---|---|---|
| C.1.1 | Express that people have created technology systems to satisfy basic needs and desires. (Expectancy 1.1.1) | Yes No |
| C.1.2 | Define a technology system as a combination of resources acting together to solve problems. (Expectancy 1.1.2) | Yes No |
| C.1.3 | Identify the human institutions and enterprises that utilize technology including: manufacturing, construction, transportation, communication, health care, agriculture, commerce, law enforcement, education, family and household, etc. (Expectancy 1.1.3) | Yes No |
| C.1.4 | Identify the resources used to create technology systems, which include: people, information, tools and machines, materials, energy, capital, and time. (Expectancy 1.2.4) | Yes No |
| C.1.5 | Express awareness of the "core technologies" - the building blocks of all technology systems. They include mechanical technology, structural technology, fluid technology, electrical technology, electronics technology, optical technology, thermal technology, biotechnology, and materials technology. (Expectancy 1.2.5) | Yes No |
| C.1.6 | Express awareness of the relationships and impacts among technological achievement, the environment, the advancement of science, the individual, and society. (Subgoal 2.2) | Yes No |

| | | |
|---|---|---|
| C.1.7 | Express awareness of technology-related careers. (Subgoal 7.3) | Yes No |
| C.1.8 | Express awareness of the importance of the historical contributions of men and women of different cultures to the advancement of technology. (Subgoal 8.1) | Yes No |
| C.1.9 | Apply knowledge and skills in the creation of simple technology systems and processes. (Subgoal 5.1) | Yes No |
| C.1.10 | Apply knowledge and skill in the safe use of basic tools, machines, materials, and processes of technology. (Subgoal 5.2) | Yes No |
| C.1.11 | Utilize a systems approach when using technology to solve problems. (Subgoal 3.1) | Yes No |
| C.1.12 | Employ higher-order thinking skills for solving problems with technology. (Subgoal 3.2) | Yes No |
| C.1.13 | Utilize individual ingenuity when using technology to solve problems. (Subgoal 3.3) | Yes No |
| C.1.14 | Demonstrate the ability to work as a team member when using technology to solve problems. (Subgoal 3.5) | Yes No |
| C.1.15 | Identify personal interests and abilities related to technology-based careers. (Subgoal 7.1) | Yes No |

Note: The information in parentheses indicates citations from *Technology Education - A Maryland Curricular Framework*.

Summary:

| | |
|---|---|
| 15 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comment:

## TECHNOLOGY EDUCATION
## INSTRUCTIONAL PROGRAM
### Grades 9-10

The instructional program in technology education for grades 9-10 is designed to develop technological literacy in all students. Technological literacy is the ability to interact successfully with technology, to assess the impacts of technology on everyday life and make appropriate decisions, and to apply conceptual knowledge to solve problems.

STANDARD: C. Instructional Program - The instructional program reflects the state and local technology education philosophy through its curriculum.

CRITERION: C.1 Instruction/Curriculum - Instruction is based on the learner outcomes for technology education.

QUALITY INDICATORS:

Instruction is provided that enables students to:

| | | |
|---|---|---|
| C.1.1 | Demonstrate knowledge and skills related to the application of technology systems. (Subgoal 1.1) | Yes No |
| C.1.2 | Demonstrate knowledge and skills related to the functioning of a variety of technology systems. (Subgoal 1.2) | Yes No |
| C.1.3 | Demonstrate knowledge of the nature and characteristics of technology. (Subgoal 2.1) | Yes No |
| C.1.4 | Demonstrate knowledge of the relationships and impacts among technological achievement, the environment, the advancement of science, the individual, and society. (Subgoal 2.2) | Yes No |
| C.1.5 | Demonstrate knowledge of the evolution of technology. (Subgoal 2.3) | Yes No |
| C.1.6 | Utilize a systems approach in solving problems with technology. (Subgoal 3.1) | Yes No |
| C.1.7 | Employ higher-order thinking skills for solving problems with technology. (Subgoal 3.2) | Yes No |
| C.1.8 | Use collaborative and individual ingenuity for solving problems with technology. (Subgoal 3.3) | Yes No |
| C.1.9 | Utilize a variety of resources and processes to solve problems with technology. (Subgoal 3.4) | Yes No |

| | | |
|---|---|---|
| C.1.10 | To work as a team member in the solution of problem. (Subgoal 3.5) | Yes No |
| C.1.11 | Identify problems resulting from technological achievements. (Subgoal 4.1) | Yes No |
| C.1.12 | Utilize resources to develop a knowledge base for making informed decisions about technological issues. (Subgoal 4.2) | Yes No |
| C.1.13 | Assess the impact of technology on the individual, society, and the environment. (Subgoal 4.3) | Yes No |
| C.1.14 | Make judgements about technological issues. (Subgoal 4.4) | Yes No |
| C.1.15 | Create technology for human purposes through the skillful use of technological resources. (Subgoal 5.1) | Yes No |
| C.1.16 | Use technology resources in a safe and responsible manner. (Subgoal 5.2) | Yes No |
| C.1.17 | Apply mathematical concepts, processes, and skills while solving problems with technology. (Subgoal 6.1) | Yes No |
| C.1.18 | Apply scientific concepts, processes, and skills while solving problems with technology. (Subgoal 6.2) | Yes No |
| C.1.19 | Utilize communication skills while solving problems with technology. (Subgoal 6.3) | Yes No |
| C.1.20 | Apply social studies concepts, processes, and skills to explore and evaluate the impacts of technology. (Subgoal 6.4) | Yes No |
| C.1.21 | Identify personal interests and abilities related to technology-based careers. (Subgoal 7.1) | Yes No |
| C.1.22 | Investigate educational opportunities and requirements related to technology-based careers. (Subgoal 7.2) | Yes No |
| C.1.23 | Investigate career opportunities, trends, and requirements related to technology-based careers. (Subgoal 7.3) | Yes No |
| C.1.24 | Identify and demonstrate factors for employability and advancement in technology-based careers. (Subgoal 7.4) | Yes No |
| C.1.25 | Perform work tasks representative of those done by engineers. (Subgoal 7.5) | Yes No |
| C.1.26 | Perform work tasks representative of those done by technologists. (Subgoal 7.6) | Yes No |

| | | |
|---|---|---|
| C.1.27 | Perform work tasks representative of those done by technicians. (Subgoal 7.7) | Yes No |
| C.1.28 | Perform work tasks representative of those done by craftspersons. (Subgoal 7.8) | Yes No |
| C.1.29 | Describes the contributions of men and women of different cultures to the advancement of technology. (Subgoal 8.1) | Yes No |
| C.1.30 | Describes the current and future implications of multicultural contributions to the advancement of technology. (Subgoal 8.2) | Yes No |

Note: The information in parentheses indicates citations from *Technology Education - A Maryland Curricular Framework*.

Summary:

| | |
|---|---|
| 30 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

## TECHNOLOGY EDUCATION INSTRUCTIONAL PROGRAM
### Grades 11-12
### (Advanced Technology Education)

Advanced technology education is an instructional program in which students develop advanced skills and deeper understandings of selected technology systems. The focus of study for advanced technology education courses is "technology"-the application of knowledge, tools and skills to solve practical problems and extend human capabilities. The goal is the development of advanced technological literacy, which is the ability to interact successfully with technology, to assess the impacts of technology on everyday life and make appropriate decisions, and to apply conceptual knowledge to solve problems.

Advanced technology education courses provide a broad-based foundation of knowledge and skills relevant to the future engineer, technologist, technician, craftsperson. The scope of advanced technology education courses is more focused than the required high school course providing opportunities for students to develop deeper understandings of technological concepts and increasingly complex technical skills. These experiences are valuable to students as they make educational and career decisions and as they apply high school experiences to career endeavors. The learner outcomes for technology education remain the basis for these programs.

There are **four approaches to the organization of advanced technology education courses.** They are to develop courses based on:

A. The Core Technologies
B. The Engineering Design and Development Process
C. Information Systems
D. A Selected Enterprise or Institution that Uses Technology

## ADVANCED TECHNOLOGY EDUCATION COURSES BASED ON THE CORE TECHNOLOGIES

The following standards apply to advanced technology education courses based on the core technologies. These courses will provide experiences in which students will extend and refine their knowledge of the core technologies and apply this knowledge to the solution of practical problems.

STANDARD: C. Instructional Program - The instructional program reflects the state and local technology education philosophy through its curriculum.

CRITERION: C.1. Instruction/Curriculum - Instruction is based on the learner outcomes for technology education.

QUALITY INDICATORS:

Instruction is provided that enables students to:

| | | |
|---|---|---|
| C.1.1 | Demonstrate knowledge and skills regarding the functioning and application of the core technologies. (Goal 1) | Yes No |
| C.1.2 | Describe the nature of technology, and the relationships and impacts among technological achievement, the environment, the advancement of science, the individual and society. The context for this knowledge shall be historical, current and futuristic. (Goal 2) | Yes No |
| C.1.3 | Solve problems with technology using a systems approach, higher-order thinking skills, individual and collaborative ingenuity, and a variety of resources including information, tools, and materials. (Goal 3) | Yes No |
| C.1.4 | Make ethical decisions about technology-related issues, including the development and use of technology and technology resources. (Goal 4) | Yes No |
| C.1.5 | Use technology resources -- including tools, machines, and materials -- in performing technological processes. (Goal 5) | Yes No |
| C.1.6 | Apply science, mathematics, language arts, social studies and technological concepts to solve practical problems and extend human capabilities. (Goal 6) | Yes No |
| C.1.7 | Apply knowledge of and perform tasks representative of technology-based careers, including engineers, technologists, technicians, and craftspersons. (Goal 7) | Yes No |

| | | |
|---|---|---|
| C.1.8 | Identify and describe the contributions to engineering and technology of men and women of different cultures. (Goal 8) | Yes No |
| C.1.9 | Design, create and apply problem solutions that incorporate **mechanical technology**. (Subgoal 5.1) | Yes No |
| C.1.10 | Design, create and apply problem solutions that incorporate **structural technology**. (Subgoal 5.1) | Yes No |
| C.1.11 | Design, create and apply problem solutions that incorporate **fluid technology**. (Subgoal 5.1) | Yes No |
| C.1.12 | Design, create and apply problem solutions that incorporate **electrical technology**. (Subgoal 5.1) | Yes No |
| C.1.13 | Design, create and apply problem solutions that incorporate **electronics technology**. (Subgoal 5.1) | Yes No |
| C.1.14 | Design, create and apply solutions to problems that incorporate **optical technology**. (Subgoal 5.1) | Yes No |
| C.1.15 | Design, create and apply solutions to problems that incorporate **thermal technology**. (Subgoal 5.1) | Yes No |
| C.1.16 | Design, create and apply solutions to problems that incorporate **bio technology**. (Subgoal 5.1) | Yes No |
| C.1.17 | Design, create and apply solutions to problems that incorporate **materials technology**. (Subgoal 5.1) | Yes No |

Note: The information in parentheses indicates citations from *Technology Education - A Maryland Curricular Framework*.

Summary:

| | |
|---|---|
| 17 | Number of Quality Indicators for this topic. |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

## ADVANCED TECHNOLOGY EDUCATION COURSES BASED ON ENGINEERING DESIGN AND DEVELOPMENT

The following standards apply to advanced technology education courses based on the engineering design and development process.

STANDARD: C. Instructional Program - The instructional program reflects the state and local technology education philosophy through its curriculum.

CRITERION: C.1. Instruction/Curriculum - Instruction is based on the learner outcomes for technology education.

QUALITY INDICATORS:

Instruction is provided that enables students to:

| | | |
|---|---|---|
| C.1.1 | Demonstrate knowledge and skills regarding the engineering and development process. (Goal 1) | Yes No |
| C.1.2 | Describe the nature of technology, and the relationships and impacts among technological achievement, the environment, the advancement of science, the individual and society. The context for this knowledge shall be historical, current and futuristic. (Goal 2) | Yes No |
| C.1.3 | Solve problems with technology using a systems approach, higher-order thinking skills, individual and collaborative ingenuity, and a variety of resources including information, tools, and materials. (Goal 3) | Yes No |
| C.1.4 | Make ethical decisions about technology-related issues, including the development and use of technology and technology resources. (Goal 4) | Yes No |
| C.1.5 | Use technology resources -- including tools, machines, and materials -- in performing technological processes. (Goal 5) | Yes No |
| C.1.6 | Apply science, mathematics, language arts, social studies and technological concepts to solve practical problems and extend human capabilities. (Goal 6) | Yes No |
| C.1.7 | Apply knowledge of and perform tasks representative of technology-based careers, including engineers, technologists, technicians, and craftspersons. (Goal 7) | Yes No |

| | | |
|---|---|---|
| C.1.8 | Identify and describe the contributions to engineering and technology by men and women of different cultures. (Goal 8) | Yes No |
| C.1.9 | Identify a problem or need that can be met through technological solutions. (Expectancy 3.1.2) | Yes No |
| C.1.10 | Research the problem. (Subgoal 4.2) | Yes No |
| C.1.11 | "Brainstorm" alternatives in solving a problem with technology. (Expectancy 3.1.2) | Yes No |
| C.1.12 | Evaluate and select a viable technological approach. (Subgoal 4.4) | Yes No |
| C.1.13 | Design a technological solution to a problem. (Expectancy 3.4.3) | Yes No |
| C.1.14 | Create technology systems through the skillful use of tools, machines, and materials. (Subgoal 5.1) | Yes No |
| C.1.15 | Test, analyze, evaluate, and refine technological solutions to problems. (Expectancy 5.1.5) | Yes No |

Note: The information in parentheses indicates citations from *Technology Education - A Maryland Curricular Framework*.

Summary:

| | |
|---|---|
| 15 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

## ADVANCED TECHNOLOGY EDUCATION COURSES BASED ON INFORMATION SYSTEMS

These courses will provide experiences in using information systems for personal and career purposes. Instruction and experiences will deal with communication systems, technical graphics, computer applications, graphic generation, publishing, audio systems, video systems, and telecommunications.

STANDARD: C. Instructional Program - The instructional program reflects the state and local technology education philosophy through its curriculum.

CRITERION: C.1. Instruction/Curriculum - Instruction is based on the learner outcomes for technology education.

QUALITY INDICATORS:

Instruction is provided that enables students to:

| | | |
|---|---|---|
| C.1.1 | Demonstrate knowledge and skills regarding information systems technology. (Goal 1) | Yes No |
| C.1.2 | Describe the nature of technology, and the relationships and impacts among technological achievement, the environment, the advancement of science, the individual and society. The context for this knowledge shall be historical, current and futuristic. (Goal 2) | Yes No |
| C.1.3 | Solve problems with technology using a systems approach, higher-order thinking skills, individual and collaborative ingenuity, and a variety of resources including information, tools, and materials. (Goal 3) | Yes No |
| C.1.4 | Make ethical decisions about technology-related issues, including the development and use of technology and technology resources. (Goal 4) | Yes No |
| C.1.5 | Use technology resources -- including tools, machines, and materials -- in performing technological processes. (Goal 5) | Yes No |
| C.1.6 | Apply science, mathematics, language arts, social studies and technological concepts to solve practical problems and extend human capabilities. (Goal 6) | Yes No |
| C.1.7 | Apply knowledge of and perform tasks representative of technology-based careers, including engineers, technologists, technicians, and craftspersons. (Goal 7) | Yes No |

| | | |
|---|---|---|
| C.1.8 | Identify and describe the contributions to engineering and technology of men and women of different cultures. (Goal 8) | Yes No |
| C.1.9 | Use a variety of information systems to perform the operations of information gathering, processing, storing, retrieving, encoding, transmitting, receiving, and decoding. (Goal 5) | Yes No |
| C.1.10 | Use drafting instruments to produce technical graphics in orthographic and pictorial projections. (Expectancy 6.3.4) | Yes No |
| C.1.11 | Use a microcomputer and appropriate software to produce computer assisted drawings (CAD). (Expectancy 6.3.4) | Yes No |
| C.1.12 | Use information systems for computer assisted design/ computer assisted manufacturing (CAD/CAM) for designing and producing a product. (Subgoal 5.1) | Yes No |
| C.1.13 | Program a computer-controlled device (robot, machine) to perform functions. (Expectancy 5.1.3) | Yes No |
| C.1.14 | Design, assemble, and interface a technology system with a computer, then, program the system to perform functions. (Goal 5) | Yes No |
| C.1.15 | Use a variety of information systems for producing text and graphic images. (Subgoal 6.3) | Yes No |
| C.1.16 | Use a variety of information systems to produce audiovisual media. (Subgoal 6.3) | Yes No |
| C.1.17 | Use an information system for telecommunicating on an electronic network. (Subgoal 6.3) | Yes No |
| C.1.18 | Use a microcomputer to process and analyze data. (Subgoal 3.4) | Yes No |

Note: The information in parentheses indicates citations from *Technology Education - A Maryland Curricular Framework*.

Summary:

| | |
|---|---|
| 18 | Number of Quality Indicators for this topic. |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

## ADVANCED TECHNOLOGY EDUCATION COURSES BASED ON A SELECTED ENTERPRISE OR INSTITUTION THAT UTILIZES TECHNOLOGY

These courses will provide experiences in which students will demonstrate knowledge and skills related to a selected enterprise or institution that uses technology. The focus of study in these courses will be on the technology that supports the enterprise or institution. Examples include: manufacturing, transportation, communication, health care, agriculture, and commerce.

STANDARD: C. Instructional Program - The instructional program reflects the state and local technology education philosophy through its curriculum.

CRITERION: C.1. Instruction/Curriculum - Instruction is based on the learner outcomes for technology education.

QUALITY INDICATORS:

Instruction is provided that enables students to:

| | | |
|---|---|---|
| C.1.1 | Demonstrate knowledge and skills regarding the technology that is used in a selected enterprise or institution. (Goal 1) | Yes No |
| C.1.2 | Describe the nature of technology, and the relationships and impacts among technological achievement, the environment, the advancement of science, the individual and society. The context for this knowledge shall be historical, current and futuristic. (Goal 2) | Yes No |
| C.1.3 | Solve problems with technology using a systems approach, higher-order thinking skills, individual and collaborative ingenuity, and a variety of resources including information, tools, and materials. (Goal 3) | Yes No |
| C.1.4 | Make ethical decisions about technology-related issues, including the development and use of technology and technology resources. (Goal 4) | Yes No |
| C.1.5 | Use technology resources -- including tools, machines, and materials -- in performing technological processes. (Goal 5) | Yes No |
| C.1.6 | Apply science, mathematics, language arts, social studies and technological concepts to solve practical problems and extend human capabilities. (Goal 6) | Yes No |

| | | |
|---|---|---|
| C.1.7 | Apply knowledge of and perform tasks representative of technology-based careers, including engineers, technologists, technicians, and craftspersons. (Goal 7) | Yes No |
| C.1.8 | Identify and describe the contributions to engineering and technology of men and women of different cultures. (Goal 8) | Yes No |
| C.1.9 | Demonstrate knowledge of the evolution, utilization, and significance of the technology systems used in the selected enterprise. (Goal 2) | Yes No |
| C.1.10 | Demonstrate knowledge of the organization, management, materials, finance, occupations, processes, and products of a selected enterprise. (Subgoal 1.2) | Yes No |
| C.1.11 | Demonstrate knowledge of the societal problems and benefits resulting from the technology systems used in a selected enterprise. (Expectancy 2.2.6) | Yes No |
| C.1.12 | Apply extended knowledge of the core technologies and problem-solving skills to the solution of practical problems. (Subgoal 3.1) | Yes No |
| C.1.13 | Create technology for human purposes through the skillful use of technology resources. (Subgoal 5.1) | Yes No |
| C.1.14 | Demonstrate the safe and effective use of technology resources including tools, machines, and materials to develop products and processes. (Subgoal 5.2) | Yes No |

Note: The information in parentheses indicates citations from *Technology Education - A Maryland Curricular Framework*.

Summary:

| | |
|---|---|
| 14 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

CRITERION: C.2. Curriculum Resources - The curriculum is developed utilizing various sources, resources, and strategies.

QUALITY INDICATORS:

The curriculum resources are developed considering:

| | | |
|---|---|---|
| C.2.1 | The human growth and development needs of students. | Yes No |
| C.2.2 | Student interests. | Yes No |
| C.2.3 | Information gathered from parent and community contacts. | Yes No |
| C.2.4 | Information and suggestions from teachers, counselors and administrators/supervisors. | Yes No |
| C.2.5 | Recommendations from the advisory committee. | Yes No |
| C.2.6 | Local, state, and national curriculum materials. | Yes No |

Summary:

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|---|---|
| 6 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

## TECHNOLOGY EDUCATION TEACHING/LEARNING STRATEGIES

Teaching/learning strategies provide the experiences that enable students to achieve the learner outcomes for technology education. They require students to design, construct, test, analyze, evaluate, measure, solve problems, plan, calculate, research, investigate, and report. Students are encouraged to use global resources in all of the teaching/learning strategies. Six teaching learning strategies have proven effective in producing the desired outcomes They include:

1. Technology Challenge
2. Topic Investigation
3. Modular Technology Activity
4. Product Generation
5. Research and Experimentation
6. Engineering Design and Development

The following standards define these teaching/learning strategies.

**TECHNOLOGY EDUCATION TEACHING/LEARNING STRATEGIES**

## TECHNOLOGY CHALLENGE

The "Technology Challenge" is a strategy designed to develop problem-solving skills. It incorporates both the explicit teaching of problem solving and laboratory practice. Challenge problems are generally identified by the teacher. Technology challenges may be completed in a single class period or long-term, requiring multiple class periods.

CRITERION: C.3. Teaching/Learning Strategies - Teaching/learning strategies are effective in enabling students to achieve the learner outcomes for technology education.

QUALITY INDICATORS:

Teaching/learning experiences involve students in:

| | |
|---|---|
| C.3.1.1 Analyzing a problem and setting goals. | Yes No |
| C.3.1.2 Identifying alternative ways to solve a problem. | Yes No |
| C.3.1.3 Selecting resources to be used in the solution of the problem. | Yes No |
| C.3.1.4 Using tools and equipment to process materials. | Yes No |
| C.3.1.5 Constructing a prototype of the problem solution. | Yes No |
| C.3.1.6 Testing, analyzing, and refining the problem solution. | Yes No |
| C.3.1.7 Collecting and processing data. | Yes No |
| C.3.1.8 Report to a group. | Yes No |

Summary:

| | |
|---|---|
| 8 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

**TECHNOLOGY EDUCATION TEACHING/LEARNING STRATEGIES**

## TOPIC INVESTIGATION

The Topic Investigation teaching/learning strategy provides a way for students to learn about technology systems and technology related topics in the context of a "central theme." The central theme may be stated as a title or as an open-ended question. Students engaged in a Topic Investigation will choose and investigate a particular technology system or topic which relates to the central theme. Student knowledge and understanding of the central theme are gained through: 1) their inquiry into sub-elements of the theme, and 2) information shared by classmates about other sub-elements of the theme. This teaching/learning strategy may stress individual and/or collaborative student involvement in the learning activities.

CRITERION: C.3. Teaching/Learning Strategies - Teaching/learning strategies are effective in enabling students to achieve the learner outcomes for technology education.

QUALITY INDICATORS:

Teaching/learning experiences involve students in:

| | | |
|---|---|---|
| C.3.2.1 | Selecting a technology related topic for investigation. | Yes No |
| C.3.2.2 | Researching a technology related topic. | Yes No |
| C.3.2.3 | Developing a report on a technology related topic. | Yes No |
| C.3.2.4 | Designing and producing a presentation aid related to a technology related topic. | Yes No |
| C.3.2.5 | Making a presentation on a technology related topic. | Yes No |

Summary:

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|---|---|
| 5 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

**TECHNOLOGY EDUCATION TEACHING/LEARNING STRATEGIES**

## MODULAR TECHNOLOGY ACTIVITY

Modular technology activities enable students to interact with specific technology systems that are not available in quantities for whole-class instruction. They are highly-structured, self-paced instructional packages that include background information, directions, hardware for manipulation, and learning assessments. These activities may involve students from 1 to 15 days.

CRITERION: C.3. Teaching/Learning Strategies - Teaching/learning strategies are effective in enabling students to achieve the learner outcomes for technology education.

QUALITY INDICATORS:

Teaching/learning experiences involve students in:

| | | |
|---|---|---|
| C.3.3.1 | Interacting with a variety of significant, modern technology systems and/or enterprises. | Yes No |
| C.3.3.2 | Working cooperatively with a classmate. | Yes No |
| C.3.3.3 | Using self-paced instructional materials. | Yes No |
| C.3.3.4 | Assessing individual learning. | Yes No |
| C.3.3.5 | Analyzing technology systems and/or enterprises. | Yes No |
| C.3.3.6 | Solving problems with technology. | Yes No |
| C.3.3.7 | Reading and understanding written information. | Yes No |
| C.3.3.8 | Writing a journal to record procedures and problems encountered in a manner that others can understand. | Yes No |

Summary:

| | |
|---|---|
| 8 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

## TECHNOLOGY EDUCATION TEACHING/LEARNING STRATEGIES

### PRODUCT GENERATION

The product generation teaching/learning strategy involves students in the processes of design, planning, production, marketing, and distribution. Students assume a variety of roles as they develop hardware and software products.

CRITERION: C.3. Teaching/Learning Strategies - Teaching/learning strategies are effective in enabling students to achieve the learner outcomes for technology education.

QUALITY INDICATORS:

Teaching/learning experiences involve students in:

| | | |
|---|---|---|
| C.3.4.1 | Identifying a need that can be met by a product. | Yes No |
| C.3.4.2 | Conducting research on a product. | Yes No |
| C.3.4.3 | Planning a product. | Yes No |
| C.3.4.4 | Producing prototypes. | Yes No |
| C.3.4.5 | Planning a production system. | Yes No |
| C.3.4.6 | Producing a product(s). | Yes No |
| C.3.4.7 | Monitoring a production process. | Yes No |
| C.3.4.8 | Comparing results with desired outcomes. | Yes No |
| C.3.4.9 | Making changes and adjustments. | Yes No |
| C.3.4.10 | Marketing and/or distributing a product. | Yes No |

Summary:

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|---|---|
| 10 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

**TECHNOLOGY EDUCATION TEACHING/LEARNING STRATEGIES**

## RESEARCH AND EXPERIMENTATION

The research and experimentation teaching/learning strategy focuses on student interests and the scientific approach to problem solving. It utilizes systematic procedures in identifying problems, asking questions, gathering data, analyzing results, and forming conclusions.

CRITERION: C.3. Teaching/Learning Strategies - Teaching/learning strategies are effective in enabling students to achieve the learner outcomes for technology education.

QUALITY INDICATORS:

Teaching/learning experiences involve students in:

| | | |
|---|---|---|
| C.3.5.1 | Identifying a problem. | Yes No |
| C.3.5.2 | Researching the literature. | Yes No |
| C.3.5.3 | Stating a hypothesis. | Yes No |
| C.3.5.4 | Planning an experiment. | Yes No |
| C.3.5.5 | Designing and fabricating test apparatus. | Yes No |
| C.3.5.6 | Conducting an experiment. | Yes No |
| C.3.5.7 | Collecting data. | Yes No |
| C.3.5.8 | Analyzing data. | Yes No |
| C.3.5.9 | Comparing results of the experiment with the hypothesis. | Yes No |
| C.3.5.10 | Reporting findings. | Yes No |

Summary:

| | |
|---|---|
| 10 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

**TECHNOLOGY EDUCATION TEACHING/LEARNING STRATEGIES**

## ENGINEERING DESIGN AND DEVELOPMENT

The engineering design and development teaching/learning strategy requires students to create products and processes to solve problems and enhance human capabilities. Students will employ a systematic model for problem solving including the elements of resources, input, process, output, and feedback. This is a long-term activity that may involve students for a quarter or a semester.

CRITERION: C.3. Teaching/Learning Strategies - Teaching/learning strategies are effective in enabling students to achieve the learner outcomes for technology education.

QUALITY INDICATORS:

Teaching/learning experiences involve students in:

| | | |
|---|---|---|
| C.3.6.1 | Identifying problems or needs that can be met through technological solutions. | Yes No |
| C.3.6.2 | Demonstrating research skills in developing an information base for design and development. | Yes No |
| C.3.6.3 | Brainstorming alternatives in solving a problem with technology. | Yes No |
| C.3.6.4 | Evaluating possible solutions and selecting a viable approach. | Yes No |
| C.3.6.5 | Designing a technological solution to a problem. | Yes No |
| C.3.6.6 | Creating technology systems through the skillful use of technology resources including tools, machines, and materials. | Yes No |
| C.3.6.7 | Testing, analyzing, and refining solutions to problems. | Yes No |

Summary:

| | |
|---|---|
| 7 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

CRITERION: C.4. Instructional Program Evaluation - The instructional program is structured to ensure that a continuous evaluation process is utilized for program development.

QUALITY INDICATORS:

The instructional program undergoes a comprehensive evaluation every four (4) years. The evaluation:

| | | |
|---|---|---|
| C.4.1 | Utilizes the state *Program Standards for Technology Education*. | Yes No |
| C.4.2 | Is performed by:<br>a. Advisory Committee members,<br>b. Teachers, including technology education staff,<br>c. Students,<br>d. Parents,<br>e. Administrators, and<br>f. Supervisors | Yes No |
| C.4.3 | Provides the basis for an action plan for program revision. The plan provides for correcting deficiencies and is used to promote, develop, and improve the instructional program. | Yes No |

Summary:

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|---|---|
| 3 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

CRITERION: C.5. Student Assessment - The instructional staff assumes responsibility for student assessment and evaluation.

QUALITY INDICATORS:

| | | | |
|---|---|---|---|
| C.5.1 | Student assessment is an integral part of instruction. | Yes | No |
| C.5.2 | Results of the student assessment process are reported to students, parents, teachers, counselors, and administrators, as appropriate. | Yes | No |
| C.5.3 | Results of the student assessment process are used to modify and enhance individual instruction. | Yes | No |
| C.5.4 | Students have opportunities to contribute to the refinement of the assessment process. | Yes | No |

Summary:

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|---|---|
| 4 | Number of Quality Indicators for this topic |
| | Minus the number of "No's" marked |
| | Total number of Quality Indicators marked "Yes" |

Comments:

**Section D**

## ADVISORY COMMITTEE

The advisory committee is an organized group of persons who serve as a link between home, school, and the community. The advisory committee has defined responsibilities and plays an important role in the efforts to improve programs.

STANDARD: D. Advisory Committee - An advisory committee is organized and has the responsibility for advising and assisting school personnel concerned with the technology education program.

CRITERION: D.1. Membership - An advisory committee is representative of the local community.

QUALITY INDICATORS:

An advisory committee:

| | | |
|---|---|---|
| D.1.1 | Exists with a minimum of three members, excluding technology education teachers. | Yes No |
| D.1.2 | Members are selected or recommended by technology education staff and administrators. | Yes No |
| D.1.3 | Includes representatives of the community, such as students, parents/guardians, business/industry persons, and representatives from community agencies. | Yes No |

CRITERION: D.2. Meetings - An advisory committee operates within a planned program of work.

An advisory committee:

| | | |
|---|---|---|
| D.2.1 | Meets formally at least once each year. | Yes No |
| D.2.2 | Has representatives that meet annually with the school administration to review and discuss concerns of the technology education program. | Yes No |

CRITERION: D.3. Roles and Responsibilities - An advisory committee assists technology education staff regarding program improvement.

An advisory committee:

| | | |
|---|---|---|
| D.3.1 | Makes recommendations to the technology education staff concerning new instructional programs and long-range planning. | Yes No |
| D.3.2 | Makes recommendations to the technology education staff concerning the selection and evaluation of instructional materials and equipment. | Yes No |
| D.3.3 | Evaluates new courses at the end of the first year and each ongoing course in a timely and periodic manner. | Yes No |
| D.3.4 | Makes recommendations concerning design, use, and updating of facilities. | Yes No |
| D.3.5 | Provides resources such as, guest speakers, demonstrations, field trips, and equipment. | Yes No |

CRITERION: D.4. Program Promotion - An advisory committee shares responsibility for actively promoting the technology education program.

The advisory committee:

| | | |
|---|---|---|
| D.4.1 | Takes an active role in interpreting and promoting the technology education program to persons and organizations within the community. | Yes No |
| D.4.2 | Actively supports and promotes the program with the school board and administrators when appropriate. | Yes No |

Summary:

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|---|---|
| 12 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

**Section E**

## FACILITIES, EQUIPMENT, AND MATERIALS

Facilities, equipment, and materials comprise the physical environment in which the technology education program is conducted. Some of the resources that support the technology education program may be located outside of the laboratory. For example, access to global resources may be located in the media center.

STANDARD: E. Facilities/Equipment/Materials - Adequate and appropriate facilities, space, equipment, supplies, and materials are provided to enable students to achieve the learner outcomes for technology education.

CRITERION: E.1. Facilities - The facilities are designed to provide for effective implementation of the technology education program.

QUALITY INDICATORS:

| | | |
|---|---|---|
| E.1.1 | Facilities, equipment, and materials support the teaching/learning strategies used. | Yes No |
| E.1.2 | Adequate space is provided for student and instructor work stations. | Yes No |
| E.1.3 | Facilities include adequate provisions for exhaust and ventilation, acoustics and illumination. | Yes No |
| E.1.4 | The appearance and arrangement of the laboratory reflect the mission of the program. | Yes No |
| E.1.5 | A telephone line is accessible for telecommunications activities. | Yes No |
| E.1.6 | The facility is accessible to disabled students. | Yes No |
| E.1.7 | The laboratory includes a classroom seating area. | Yes No |
| E.1.8 | The laboratory can facilitate small group meetings. | Yes No |
| E.1.9 | The laboratory includes a design area. | Yes No |
| E.1.10 | The laboratory includes a research area. | Yes No |
| E.1.11 | The laboratory includes a modular instructional activity area. | Yes No |
| E.1.12 | The laboratory includes a dynamic testing area. | Yes No |
| E.1.13 | The laboratory includes a production/fabrication area. | Yes No |
| E.1.14 | The laboratory includes teacher office space. | Yes No |

| | | |
|---|---|---|
| E.1.15 | The laboratory includes material storage area. | Yes No |
| E.1.16 | The laboratory includes project storage area. | Yes No |
| E.1.17 | The laboratory includes a finishing area. | Yes No |
| E.1.18 | Illumination is sufficient and well placed. | Yes No |
| E.1.19 | Temperature, humidity, and air movement are within comfort limits. | Yes No |
| E.1.20 | Ventilation is adequate. | Yes No |
| E.1.21 | Cleanliness and sanitation are evident throughout the laboratory. | Yes No |

CRITERION: E.2. Safety - Facilities, equipment, and materials meet safety standards.

QUALITY INDICATORS:

| | | |
|---|---|---|
| E.2.1 | Ample space is provided for machines and other equipment. | Yes No |
| E.2.2 | Work tables are secured to the floor and table tops are secured to legs or bases. | Yes No |
| E.2.3 | Permanently placed machines are fastened to the floor or bench. | Yes No |
| E.2.4 | Safety zones are clearly marked around each piece of equipment. | Yes No |
| E.2.5 | Safety posters are posted at each piece of fixed equipment. | Yes No |
| E.2.6 | Approved eye protection equipment is worn by each person who enters a laboratory where material is being formed or separated. | Yes No |
| E.2.7 | Eye protection equipment is properly maintained. | Yes No |
| E.2.8 | Face shields are worn when working with hot metal or power-driven machines. | Yes No |
| E.2.9 | Machine guards are utilized. | Yes No |

CRITERION: E.3. Instructional Materials - Adequate instructional materials are provided to meet program goals.

QUALITY INDICATORS:

| | | |
|---|---|---|
| E.3.1 | Instructional materials are adequate to support current technology education teaching/learning strategies. | Yes No |
| E.3.2 | Audiovisual resources are relevant and readily available. | Yes No |
| E.3.3 | There is an ongoing review of instructional materials. | Yes No |

Summary:

| | |
|---|---|
| 30 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

**Section F**

## ADMINISTRATION AND SUPERVISION

The Administration/Supervision Staff is defined as the personnel at the school or central office who is responsible for supervising and providing leadership for the technology education program.

STANDARD: F. Administration/Supervision - The administrative/supervisory staff has the responsibility to assist in management, evaluation, and promotion of the technology education program.

CRITERION: F.1. Management - The administrative/supervisory staff manages the technology education program.

QUALITY INDICATORS:

School-based administrative/supervisory personnel:

| | | |
|---|---|---|
| F.1.1 | Organizes and utilizes a technology education advisory committee. | Yes No |
| F.1.2 | Manages the financial aspects of the technology education program. | Yes No |
| F.1.3 | Assists in planning facilities and makes recommendations for purchase and maintenance of equipment. | Yes No |

Central office-based administrative/supervisory personnel:

| | | |
|---|---|---|
| F.1.4 | Directs long-range planning for the technology education program. | Yes No |
| F.1.5 | Assists in planning facilities and makes recommendations for purchase and maintenance of equipment. | Yes No |
| F.1.6 | Makes recommendations concerning staffing. | Yes No |
| F.1.7 | Manages the planning, implementation, and evaluation of in-service education programs for technology education. | Yes No |

CRITERION: F.2. Evaluation - The administrative/supervisory staff has responsibility for directing evaluation activities.

QUALITY INDICATORS:

Central office based and school based administrative/supervisory personnel:

| | | |
|---|---|---|
| F.2.1 | Participate in the evaluation of the technology education program. | Yes No |
| F.2.2 | Utilize the results of evaluations to improve the technology education program. | Yes No |

CRITERION: F.3. Promotion - The administrative/supervisory personnel promotes technology education by establishing a comprehensive public relations program.

QUALITY INDICATORS:

Administrative/supervisory personnel:

| | | |
|---|---|---|
| F.3.1 | Utilizes a variety of techniques to promote the technology education program, i.e., brochures, open-house. | Yes No |
| F.3.2 | Promotes technology education programs to persons in various educational settings, i.e., counselors. | Yes No |
| F.3.3 | Promotes the technology education program to persons in the community utilizing newspaper articles, exhibits, etc. | Yes No |

Summary:

| | |
|---|---|
| 12 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

**Section G**

## INSTRUCTIONAL STAFF

The Instructional Staff is defined as the personnel responsible for teaching the technology education program.

STANDARD: G. Instructional Staff - The instructional staff exhibits professionalism, is qualified, and assumes responsibility for conducting the instructional program.

CRITERION: G.1. Education/Certification - The instructional staff has the educational preparation necessary to conduct the instructional program.

QUALITY INDICATORS:

Technology education teachers have:

| | | |
|---|---|---|
| G.1.1 | A baccalaureate degree. | Yes No |
| G.1.2 | Certification in Industrial Arts/Technology Education. (Middle and High School Teachers) | Yes No |
| G.1.3 | A continuing professional development plan that includes appropriate baccalaureate and graduate programs. | Yes No |
| G.1.4 | Preparation in the philosophy of technology education. | Yes No |
| G.1.5 | Educational preparation in planning and implementing the curriculum. | Yes No |
| G.1.6 | Educational preparation in student assessment techniques. | Yes No |
| G.1.7 | Educational preparation to establish and utilize procedures that create a safe and positive learning environment. | Yes No |
| G.1.8 | Educational preparation to work with all population types. | Yes No |
| G.1.9 | Educational preparation to address current and future trends in technology education. | Yes No |
| G.1.10 | Educational preparation for integrating science, mathematics, language arts, social studies, and technological concepts into the program. | Yes No |

Technology education teachers:

| | | |
|---|---|---|
| G.1.11 | Participate in professional organizations. | Yes No |
| G.1.12 | Contribute to staff development efforts. | Yes No |

CRITERION: G.2. Instruction - The instructional staff facilitates learning through instructional activities.

QUALITY INDICATORS:

The instructional staff:

| | | |
|---|---|---|
| G.2.1 | Assumes responsibility for planning, organizing, and conducting instruction. | Yes No |
| G.2.2 | Assists in developing and revising the program curriculum, based upon local and state curriculum guides and policies. | Yes No |
| G.2.3 | Maintains a comprehensive list of community resources that may be used in the delivery of the program. (i.e., field trips, community service projects, speakers, and community agencies.) | Yes No |

CRITERION: G.3. Management - The instructional staff manages the instructional program.

QUALITY INDICATORS:

The instructional staff:

| | | |
|---|---|---|
| G.3.1 | Maintains organized records and reports. | Yes No |
| G.3.2 | Makes and prioritizes recommendations for the purchase of material and equipment. | Yes No |
| G.3.3 | Assesses needs for supplies, materials, and equipment. | Yes No |
| G.3.4 | Establishes a classroom management system that promotes a safe and positive learning environment. | Yes No |

CRITERION: G.4. Evaluation - The instructional staff assumes responsibility for evaluating the technology education program.

QUALITY INDICATORS:

The instructional staff:

| | | |
|---|---|---|
| G.4.1 | Conducts a formal self-evaluation of professional performance utilizing local and state technology education standards and other criteria. | Yes No |
| G.4.2 | Conducts an ongoing informal evaluation of the technology education program. | Yes No |

Summary:

| | |
|---|---|
| 21 | Number of Quality Indicators for this topic |
| | Number of Quality Indicators marked "No" |
| | Number of Quality Indicators marked "Yes" |

Comments:

# Appendix

## Assessment Forms

### Technology Education Program Profile

DIRECTIONS: Fill in the number of quality indicators met in each standard topic.

| Identification Number | Description | Number of Quality Indicators For This Topic | Yes Responses | No Responses |
|---|---|---|---|---|
| Section A | Philosophy | 13 | | |
| Section B | Population | 26 | | |
| Section C.1 | Instruction/Curriculum<br>Technology Education Grades K-5 | 10 | | |
| Section C.1 | Instruction/Curriculum<br>Technology Education Grades 6-8 | 23 | | |
| Section C.1 | Instruction/Curriculum<br>Technology Education Grades 9-10 | 30 | | |
| Section C.1 | Instruction/Curriculum<br>Advanced Technology Education<br>Core Technologies | 17 | | |
| Section C.1 | Instruction/Curriculum<br>Advanced Technology Education<br>Engineering Design and Development | 15 | | |
| Section C.1 | Instruction/Curriculum<br>Advanced Technology Education<br>Information Systems | 18 | | |
| Section C.1 | Instruction/Curriculum<br>Advanced Technology Education<br>Technology Enterprises | 14 | | |
| Section C.2 | Curriculum Resources | 6 | | |
| Section C.3 | Teaching/Learning Strategies<br>Technology Challenges | 8 | | |
| Section C.3 | Teaching/Learning Strategies<br>Technology Investigations | 6 | | |
| Section C.3 | Teaching/Learning Strategies<br>Modular Technology Activities | 8 | | |
| Section C.3 | Teaching/Learning Strategies<br>Product Generation | 10 | | |

**Technology Education Program Profile** (continued)

| Identification Number | Description | Number of Quality Indicators For This Topic | Yes Responses | No Responses |
|---|---|---|---|---|
| Section C.3 | Teaching/Learning Strategies Research & Experimentation | 10 | | |
| Section C.3 | Teaching/Learning Strategies Engineering Design & Development | 7 | | |
| Section C.4 | Instructional Program Evaluation | 3 | | |
| Section C.5 | Student Assessment | 4 | | |
| Section D | Advisory Committee | 12 | | |
| Section E | Facilities, Equipment, and Materials | 30 | | |
| Section F | Administration and Supervision | 12 | | |
| Section G | Instructional Staff | 21 | | |

Shaded areas indicate topics that may not be relevant to all programs. In these areas, complete only those lines that are appropriate for your program.

## IMPROVEMENT REPORT

DIRECTIONS: Complete this form for each quality indicator that you answered "NO" to.

School: _____ Reported By _____ Date: _____

Quality indicator not being met: _____

_____

Priority for Improvement: High Medium Low

Person(s) responsible for improvement: _____

Plan for Improvement:

Resources Required:

Estimated Cost: $ _____

Estimated Completion Date: _____

Date Standard Met: _____

## GLOSSARY

Advanced Technology Education - Advanced technology education is an instructional program in which students develop advanced skills and deeper understandings of selected technology systems.

Advanced Technology Education Program - A series of related courses that enable students to develop a significant knowledge and skills base related to a selected technology system or process.

Core Technologies - The building blocks from which all technology systems are derived, which include mechanical technology, structural technology, fluid technology, electrical technology, electronics technology, optical technology, thermal technology, biotechnology, and materials technology.

Prototype - A model of a final product or structure that is built to help evaluate the soundness of a design and to discover unanticipated problems. Technology - The application of knowledge, tools and skills to solve practical problems and extend human capabilities.

Systems Approach - The use of a formal method (system) to solve technological problems. It includes: defining a problem, setting goals, developing alternative solutions, selecting the best solution, implementing the solution, evaluating the actual results, and making necessary changes.

Technology Education - Technology education is an integrated, experienced-based instructional program designed to prepare a population that is knowledgeable about technology - its evolution, systems, techniques, utilization, and social and cultural significance.

Technological Literacy - The abilities to interact successfully with technology, to assess the impacts of technology on everyday life and make appropriate decisions, and to apply conceptual knowledge in order to solve problems.

Technology System - A combination of resources (people, information, tools and machines, materials, time, energy, and capital) working together to solve problems and extend human capabilities.

STANDARDS FOR TECHNOLOGY EDUCATION PROGRAMS IN MARYLAND
REVIEW AND COMMENT FORM

## FOREWORD, PURPOSE, AND USERS GUIDE

**How thoroughly did you read this section?** (check one)

__ All the way through __ Skimmed or read parts of it

__ Did not read this section. If not, please tell us why you did not read this section and skip to the next major section. _____

_____

**The "Foreword" clearly states the Maryland State Department of Education's interest in the development of standards for technology education programs.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide comments.*

_____

_____

**The "Purpose" is clearly stated.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

_____

_____

**The "User's Guide for the Standards" is clear.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

_____

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**Overall Comments:**

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## STANDARDS FOR TECHNOLOGY EDUCATION PROGRAMS IN MARYLAND
## REVIEWER PROFILE SHEET

Before reading the document, please supply the following information in the space provided:

Name of respondent (please print): _____

Organization represented, if any: _____

Address: _____

_____

Phone: ( _ _ _ ) _ _ _ - _ _ _ _ Fax: ( _ _ _ ) _ _ _ - _ _ _ _

E-mail: _____ Date: _____

Gender ___ Female ___ Male Ethnicity: ___ African American, ___ Caucasian, ___ Latino/Hispanic, ___ Asian/Pacific Islander, ___ Other (please specify) _____

Age ___ 18-25 ___ 26-35 ___ 36-45 ___ 46-55 ___ Over 55

To assist in determining the perspective of this reviewer, please take a moment to check the appropriate boxes.

My primary interest in reviewing this document is as a(n):

Please specify ___ public school ___ private school

**___ Teacher**
- ___ Pre-K
- ___ Elementary
- ___ Middle
- ___ High
- ___ 2 -Year College
- ___ 4-Year College/University
- ___ Other (Please specify) _____

**___ Academic Administrator**
- ___ Curriculum Specialist
- ___ Principal/V. Principal
- ___ Superintendent
- ___ Education Association
- ___ Other (please specify) _____

**___ Non-Academic Affiliate**
- ___ Trade Associate
- ___ Government Agency
- ___ Business & Industry
- ___ Other (please specify) _____

**___ Parent/Guardian** **___ Student** **___ Government Official**

My primary interest in education is:

___ Science ___ Mathematics ___ Technology
___ Vocational ___ Humanities ___ Engineering
___ Other (please specify) _____

Please return these forms to:
Robert Gray, Specialist in Technology Education
Maryland State Department of Education
Division of Career Technology and Adult Learning
200 West Baltimore Street
Baltimore, MD 21201-2595
Fax (410) 333-2099

STANDARDS FOR TECHNOLOGY EDUCATION PROGRAMS IN MARYLAND

REVIEW AND COMMENT FORM

## SECTION A - PHILOSOPHY

**How thoroughly did you read this section?** (check one)

__ All the way through __ Skimmed or read parts of it

__ Did not read this section. If not, please tell us why you did not read this section and skip to the next major section. _____

_____

**The opening statement clearly describes the purpose and elements of a philosophy.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

_____

_____

**The Standard and Criteria are clearly stated.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

_____

_____

**The Quality Indicators adequately address the standard and criteria.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

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STANDARDS FOR TECHNOLOGY EDUCATION PROGRAMS IN MARYLAND
REVIEW AND COMMENT FORM

## SECTION B - POPULATION SERVED

**How thoroughly did you read this section?** (check one)

__ All the way through __ Skimmed or read parts of it

__ Did not read this section. If not, please tell us why you did not read this section and skip to the next major section. _____

_____

**The opening statement describes the purpose and elements of this section.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

_____

_____

**The Standard and Criteria are clearly stated.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

_____

_____

**The Quality Indicators adequately address the standard and criteria.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

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STANDARDS FOR TECHNOLOGY EDUCATION PROGRAMS IN MARYLAND
REVIEW AND COMMENT FORM

## SECTION C - INSTRUCTIONAL PROGRAM

**How thoroughly did you read this section?** (check one)

__ All the way through __ Skimmed or read parts of it

__ Did not read this section. If not, please tell us why you did not read this section and skip to the next major section._____

_____

**The opening statement describes the purpose and elements of this section.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

_____

_____

**The Standard and Criteria are clearly stated.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

_____

_____

**The Quality Indicators adequately address the standard and criteria.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

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__ with substantive revision

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## SECTION D - ADVISORY COMMITTEE

**How thoroughly did you read this section?** (check one)

__ All the way through __ Skimmed or read parts of it

__ Did not read this section. If not, please tell us why you did not read this section and skip to the next major section._____

_____

**The opening statement describes the purpose and elements of this section.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

_____

_____

**The Standard and Criteria are clearly stated.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

_____

_____

**The Quality Indicators adequately address the standard and criteria.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

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## SECTION E - FACILITIES/EQUIPMENT/MATERIALS

**How thoroughly did you read this section?** (check one)

__ All the way through __ Skimmed or read parts of it

__ Did not read this section. If not, please tell us why you did not read this section and skip to the next major section._____

_____

**The opening statement describes the purpose and elements of this section.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

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**The Standard and Criteria are clearly stated.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

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_____

**The Quality Indicators adequately address the standard and criteria.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

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## SECTION F - ADMINISTRATION/SUPERVISION

**How thoroughly did you read this section?** (check one)

__ All the way through __ Skimmed or read parts of it

__ Did not read this section. If not, please tell us why you did not read this section and skip to the next major section._____

_____

**The opening statement describes the purpose and elements of this section.**

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Comments: *If you have checked disagree or disagree strongly, please provide* comments.

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_____

**The Standard and Criteria are clearly stated.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

_____

_____

**The Quality Indicators adequately address the standard and criteria.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

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__ with substantive revision

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## SECTION G - INSTRUCTIONAL STAFF

**How thoroughly did you read this section?** (check one)

__ All the way through __ Skimmed or read parts of it

__ Did not read this section. If not, please tell us why you did not read this section and skip to the next major section._____

_____

**The opening statement describes the purpose and elements of this section.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

_____

_____

**The Standard and Criteria are clearly stated.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

_____

_____

**The Quality Indicators adequately address the standard and criteria.**

__ Agree Strongly __ Agree __ Cannot Judge __ Disagree __ Disagree Strongly

Comments: *If you have checked disagree or disagree strongly, please provide* comments.

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